

ON SHELLS FLOATING ON THE SURFACE OF THE SEA.

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(Communicated by A. C. Johansen, M.Sc.)

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In a paper "On the hypotheses on the sinking of sea-beds, based on the occurrence of dead shallow-water shells at great depths in the sea,"¹ Mr. A. C. Johansen discussed the agencies by which the shells of Mollusca may be transported from the places where the animals lived, and spread over the bottom of the ocean (p. 427). Among these are mentioned:—“Marine surface currents. These transport (a) floating ice, (b) seaweeds to which molluscs are fixed, (c) the molluscs themselves.”

The evidences for this last method of transportation (c) were the following (pp. 429–30):—

I. On the occasion of a determination of the specific gravity of some shells Mr. Johansen and I noticed that some specimens of *Mytilus edulis*, taken alive, but kept dry for a couple of days, were able to float. One of them floated for more than 24 hours.

II. In an experiment with another species of *Mytilus* Mr. Johansen found that some small dead specimens floated for several days.

III. The Danish East Greenland Expedition of 1892 actually obtained one specimen of *Mytilus edulis*, 11 mm. in length and probably dead, floating in the open ocean (lat. 75° 37' N., long. 6° 40' W.).

In another paper² Mr. Johansen recorded (pp. 15–16) similar occurrences in fresh waters. He found shells, filled with air, of *Bithynia tentaculata*, *Valvata cristata*, and several species of *Limnæa* and *Planorbis* floating about in great numbers in lakes, and he mentions that Dr. W. Sörensen has several times observed shells of *Planorbis corneus*, occupied by *Argyroneta*, floating about in ponds in springtime.

Possibly the instances above set forth—and they are all that Mr. Johansen has been able to find—will be thought to be somewhat meagre, though it should be borne in mind that the chance of obtaining specimens by tow-netting must be extremely small, even if their total number a year is rather considerable; the more so, as the shells will float on the very surface of the water, and most tow-netting is carried on at a depth of at least some inches.

¹ Vid. Medd. Naturh. Foren. Kjöbenhavn, 1902, pp. 393–435.

² “Om Aflejringen af Molluskernes Skaller i Innsøer og i Havet” (“On the Deposition of Shells in Lakes and in the Sea”): Vid. Medd. Naturh. Foren. Kjöbenhavn, 1901, pp. 5–46.

The scarcity of evidence may also be partly due to the circumstance that facts bearing on this point have been, to a great extent, overlooked by Naturalists, and not recorded when casually observed; but this, I trust, will no longer be the case now that the attention of observers has been drawn towards the subject.

As a first contribution I venture to publish the following observation. On the 26th of September last I rowed about in a Greenland 'kajak' (a very small boat, made of seal-skin, for a single person) near the harbour of Grenaa in the Kattegat (between the Baltic and the North Sea), and on this occasion I observed *Mactra subtruncata*, Da Costa, floating on the surface of the water to the number of at least several hundreds. They were floating in a rather narrow band in a south-easterly direction. There was a slight wind from the south-east, and the waves were only one to two feet in height. The shells were from 2 to 7 or 8 mm. in length, tightly closed, and more or less (in most cases totally) filled with air. Some of them probably contained animals, but these must have been completely dried up.

I followed the stream of shells from the point where I noticed it, a few hundred yards from the shore, towards the place where it originated, and I found this to be a bank of sand some 10 to 20 yards from the shore, and, at that time, only covered by about 6 inches of water. Here the shells were found in a regular layer, and this bank had been dry for about two successive days past, there being practically no tide in these waters.

Since in the Kattegat this species only descends to a depth of about 12 fathoms, it is highly probable that some of the shells would sink to the bottom beyond the range of distribution of the living animal. I therefore think that this record may be of some interest as an instance of what may take place at a great many points off sea-beaches.